

DIGITAL LEARNING READINESS AND ACADEMIC ENGAGEMENT: THE ROLE OF LEARNING MOTIVATION

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Abstract: *The rapid expansion of digitally mediated learning in higher education has heightened the need to understand how students meaningfully participate in technology enhanced environments. Although digital learning readiness and academic engagement have been widely studied, these constructs are often examined as separate areas of inquiry. Readiness research tends to emphasise measurement, preparedness, and capability, whereas engagement scholarship focuses on behavioural, emotional, and cognitive participation in learning. The theoretical mechanism explaining how learner capability becomes enacted engagement therefore remains insufficiently articulated. This conceptual paper proposes an integrated framework that positions digital learning readiness as a foundational learner resource and learning motivation as the activating mechanism that converts readiness into academic engagement. Drawing on established readiness constructs and Self Determination Theory, the model argues that competence alone does not guarantee sustained participation. Instead, motivational processes shape whether digital capability becomes meaningful behavioural, emotional, and cognitive involvement. The framework specifies both a direct relationship between readiness and engagement and an indirect relationship mediated by learning motivation, thereby adopting a partial mediation logic rather than a deterministic capability model. Recent studies during digital learning transitions support the need to examine readiness and motivation together, as student readiness for live online learning has been linked with motivation, self efficacy, and participation conditions in higher education contexts (Tang et al., 2021; Wagiran et al., 2022). By integrating previously parallel research streams into a coherent explanatory structure, this study advances theoretical understanding of student participation in digitally mediated higher education and provides a foundation for future empirical validation and institutional application.*

Keywords: *Digital Learning readiness, Academic engagement, Learning motivation, Self-Determination Theory*

Introduction

The rapid adoption of digital learning has transformed the landscape of higher education globally. Learning management systems and blended learning models are increasingly critical for universities to deliver their curriculum. While institutions have invested heavily in technology, these environments will not succeed unless students can navigate them effectively. This capability is widely referred to as digital learning readiness. In this paper, digital learning readiness is treated as learner capability, whereas academic engagement is treated as the enactment of that capability through behavioural, emotional, and cognitive participation.

Being ready for digital learning implies more than just knowing how to use technology or having internet access. Hung, Chou, Chen, and Own (2010) characterise it as a multifaceted construct encompassing computer self-efficacy, self-directed learning, learner control, motivation, and confidence in online communication. Their findings classify readiness as a psychological attribute rather than merely a technical competency. Similarly, Broadbent and Poon (2015) suggest that readiness is fundamentally about a learner's ability to self-regulate when facing digital demands. Scholars have conducted comprehensive measurements of readiness; yet, its theoretical linkage to broader engagement frameworks remains underexplored.

Recent scholarship suggests that digital learning readiness and academic engagement should not be treated as interchangeable constructs. Although both concepts relate to student participation in technology-mediated learning environments, they represent fundamentally different dimensions of the learning process. Digital learning readiness primarily reflects a student's capability, preparedness, and psychological capacity to function effectively within digital learning settings. In contrast, academic engagement reflects the actual enactment of learning behaviours, emotions, and cognitive investment during participation in educational activities. Thus, readiness may indicate potential for participation, whereas engagement represents the manifestation of that potential in practice. This distinction is theoretically important because students may possess adequate technological competencies and self-regulatory capabilities yet still fail to actively engage in learning activities. Prior studies have often examined readiness as a predictor of academic outcomes without sufficiently explaining the psychological processes through which readiness translates into sustained participation and involvement in learning activities (Bond et al., 2020; Martin et al., 2020). Consequently, a clearer conceptual separation between readiness as capability and engagement as enactment is necessary to better understand how learners transition from preparedness to active academic participation in blended and online learning environments.

Academic engagement has consistently been associated with student performance and persistence in higher education. Fredricks, Blumenfeld, and Paris (2004) classify engagement into behavioural, emotional, and cognitive dimensions. Engagement signals active investment in learning processes rather than merely confirming that learning has occurred. Kahu (2013) presents an alternative perspective, characterizing engagement not merely as student effort, but as a response to the interaction between the student and the university. From this view, a student's individual characteristics serve as the catalyst for involvement.

There is no shortage of research on digital learning readiness or academic engagement. However, these two research streams rarely intersect. The literature on readiness usually fixates

on the mechanics of validation, such as creating scales or measuring how prepared students are (Hung et al., 2010; Rasheed et al., 2020). In contrast, engagement research tends to look outward. It prioritizes elements like curriculum design or the classroom atmosphere (Fredricks et al., 2004; Kahu, 2013), often treating the learner's own traits as mere background noise. Moreover, studies on blended learning engagement often overlook the foundational role of student readiness (Sun & Rueda, 2012).

Consequently, despite advancements in conceptualizing engagement within blended learning environments (Halverson & Graham, 2019), the integration of readiness and engagement remains theoretically under-specified. Just because a student possesses technical skills does not guarantee academic performance. A student might be capable of doing the work but lack the volition to do so. Self-Determination Theory (SDT) posits that the quality of motivation influences a student's persistence in learning activities (Deci & Ryan, 2000). In this context, readiness provides the capacity to act, whereas motivation likely determines whether that action actually occurs.

This creates a significant conceptual gap. We understand that readiness is important and engagement is necessary, but we still lack a clear theoretical understanding of how they relate. In particular, the psychological mechanism that transforms digital proficiency into enduring academic engagement remains unclear. This disconnect is especially critical in technology mediated higher education, where independence and self regulation are not simply desirable but necessary. Without this clarification, readiness may be treated as a static checklist rather than as a flexible learner resource that shapes participation. Recent studies on live online learning and pandemic based online education reinforce this concern by showing that readiness, motivation, self efficacy, and learning conditions operate together rather than as isolated factors (Tang et al., 2021; Rafique et al., 2021).

Therefore, this paper reconceptualises digital learning readiness as a foundational learner resource. It positions learning motivation as the specific psychological mechanism that activates this readiness, converting latent potential into sustained academic engagement.

Literature Review

Theoretical Foundations

Digital Learning Readiness as a Learner Resource

Historically, research has viewed digital learning readiness primarily through the lens of measurement. Hung et al. (2010) moved the focus beyond simple technical access by developing a multidimensional instrument to assess online learning readiness. They identified five key dimensions: computer self efficacy, self directed learning, learner control, motivation for learning, and online communication self efficacy. This work established readiness as a psychological and behavioural capability rather than merely a condition of technological access. Later studies in the COVID period continued to show that readiness is not limited to access or platform familiarity. For example, Abu Bakar, Izni Zamri, and Ezetty Rohaizat (2021) reported positive student responses toward online learning readiness and a positive relationship between readiness and performance among higher institution students in Selangor.

Building on this foundation, Broadbent and Poon (2015) pinpointed self-regulation as the anchor for success in online higher education. In their systematic review, they highlighted that self-regulated learning strategies are central to academic achievement. Their findings suggest that readiness is not a static trait. Instead, it reflects a learner's dynamic ability to manage cognitive and motivational demands in digital environments.

Despite these findings, the literature often stops at description. Studies typically treat readiness as a diagnostic tool to determine if students are prepared, without fully explaining how that readiness functions within the broader learning process. This paper takes a different stance by reconceptualising readiness as a personal resource. It represents a set of capabilities that make engagement possible but do not guarantee it. Readiness functions as potential capacity within the learner. Whether this potential transforms into active participation depends on other psychological processes.

Academic Engagement as Active Investment in Learning

Academic engagement has consistently been associated with improved academic performance and persistence in higher education contexts. Fredricks, Blumenfeld, and Paris (2004) conceptualised engagement as behavioural, emotional, and cognitive investment in learning. In higher education, engagement is typically reflected through sustained participation, affective involvement, and deep cognitive effort. Kahu (2013) frames engagement as an outcome of interactions between institutional conditions and students' psychosocial factors, rather than as student effort alone. This perspective highlights the importance of learner level resources and psychological conditions in shaping engagement.

More recent engagement scholarship strengthens this distinction by showing that engagement is not simply attendance, access, or platform use. Kahu and Nelson (2018) describe engagement as emerging within an educational interface where psychosocial influences and institutional conditions meet. Redmond et al. (2018) also argue that online engagement in higher education should be understood through multiple forms of involvement, including behavioural, cognitive, emotional, social, and collaborative engagement. Bond et al. (2020) further show that educational technology research often gives greater attention to behavioural indicators, while affective and cognitive engagement require deeper conceptual treatment. This matters for the present paper because digital readiness can support access and confidence, but engagement only occurs when students direct effort, emotion, and thought toward learning tasks. Engagement is therefore treated as enacted participation rather than as a synonym for readiness.

Learning Motivation and Self-Determination Theory

To understand how readiness translates into active engagement, attention must be directed to the quality of student motivation. Self-Determination Theory provides a useful lens for explaining why learners sustain effort and involvement. As outlined by Deci and Ryan (2000), motivation is not a single construct but a continuum. It ranges from pure internal drive (intrinsic) to external pressure (extrinsic). According to Self-Determination Theory, learners demonstrate deeper involvement and sustained persistence when their motivation is autonomously regulated, rather than being pushed by a system or an instructor.

In digital learning environments, autonomy becomes particularly critical. Without a physical classroom to keep them on track, students must act as their own managers. Students must

determine when to log in, how to manage their time, and how to persist despite technical challenges. In this context, digital learning readiness reflects perceived competence and capability, whereas learning motivation reflects volitional activation and persistence toward learning goals.

Taken together, readiness can be viewed as a foundational capability, engagement as the observable learning investment, and motivation as the mechanism that activates capability into sustained involvement. By integrating these three constructs, this paper moves beyond isolated examination and conceptualises them as an interdependent explanatory mechanism.

Conceptual Integration

The preceding discussion positions digital learning readiness, academic engagement, and learning motivation as distinct but related constructs. The central task is to articulate how these constructs operate within a unified theoretical structure.

Digital learning readiness is more than technical access; it is a multidimensional capability (Hung et al., 2010). It represents a form of personal capacity embedded within the learner. However, capacity alone does not guarantee academic involvement. A student may possess the skills to navigate digital environments yet still remain disengaged from meaningful participation.

Academic engagement, as described by Fredricks et al. (2004), involves behavioural effort, emotional investment, and cognitive depth. Engagement signals that learning energy is being directed toward academic tasks. However, such engagement does not arise automatically from competence alone. It requires a psychological activation process.

Self-Determination Theory offers the lens to understand this activation. Deci and Ryan (2000) argue that the quality of motivation is what determines persistence and deeper involvement. In digital contexts, where students must manage their own study behaviours, motivation becomes decisive. Even when learners are technically prepared, the absence of internal drive can weaken their actual engagement.

Taken together, these perspectives suggest a layered relationship. Digital learning readiness provides the structural capability. Learning motivation determines whether that capability is mobilised. Academic engagement is the final manifestation of that mobilisation. In this view, readiness is not a static checklist but a latent learner resource. Its effect is shaped by motivational processes. This logic is consistent with Wagiran et al. (2022), who found that motivation played a significant role in an e learning readiness model involving technological skills, equipment capability, and user satisfaction among higher education students.

By positioning readiness as a resource and motivation as the activating mechanism, this framework moves beyond parallel discussions. It offers a structured explanation of how digital capability becomes sustained academic involvement.

Learning Motivation as the Link Between Readiness and Engagement

While digital learning readiness has received extensive scholarly attention, much of the literature remains concentrated on measurement, classification, and predictive profiling rather

than explaining the behavioural enactment of participation itself. Existing readiness studies frequently identify whether students possess sufficient technological skills, self-directed learning capability, or online communication competence (Hung et al., 2010; Martin et al., 2020; Rafique et al., 2021). However, these studies often stop at determining preparedness without fully theorising how preparedness becomes sustained academic participation.

This limitation becomes increasingly important in digitally mediated higher education environments where possessing capability does not necessarily result in meaningful involvement. Students may demonstrate high technological competence yet remain passive, detached, or minimally participative within online learning spaces. Consequently, readiness alone appears insufficient to explain actual engagement behaviour. This observation aligns with broader engagement literature arguing that participation is not merely a function of skill possession, but also reflects psychological investment, emotional involvement, and sustained behavioural commitment (Fredricks et al., 2004; Appleton et al., 2008; Kahu & Nelson, 2018).

The engagement literature provides a more dynamic understanding of student participation by conceptualising engagement as enacted investment rather than latent capability. Engagement scholars consistently emphasise that participation involves active energy expenditure toward learning tasks, including persistence, concentration, emotional attachment, and cognitive effort (Skinner et al., 2009; Sinatra et al., 2015). From this perspective, readiness represents only one antecedent condition among several factors that shape participation outcomes.

Although studies have reported positive associations between digital readiness and academic outcomes, many readiness models remain descriptively oriented and theoretically fragmented. For example, research frequently examines readiness dimensions independently, such as self-efficacy, technical competency, or learner autonomy, without sufficiently integrating these constructs into broader explanatory participation frameworks (Muthuprasad et al., 2021; Tang et al., 2021). As a result, the mechanism explaining why some digitally ready students actively engage while others disengage remains underdeveloped.

This unresolved issue suggests that an intervening psychological process may be necessary to explain how readiness translates into engagement. Self-Determination Theory provides an important explanatory foundation in this regard. According to Deci and Ryan (2000), competence alone does not guarantee behavioural persistence. Individuals become actively engaged when competence is accompanied by autonomous motivational regulation. In digitally mediated environments characterised by reduced physical supervision and increased learner autonomy, motivational quality becomes especially influential.

Within this framework, learning motivation functions as the psychological mechanism that converts readiness into enacted participation. Digital learning readiness provides learners with perceived capability and control, whereas learning motivation determines whether these capabilities are mobilised toward sustained academic involvement. This interpretation aligns with online learning scholarship showing that self regulation, technology self efficacy, and motivational conditions are associated with engagement and course outcomes in digital environments (Sun & Rueda, 2012; Wang et al., 2013; Hartnett, 2016).

Importantly, the present framework does not position learning motivation as a full mediator. Instead, the model adopts a partial mediation perspective. Digital learning readiness is expected to exert both direct and indirect influences on academic engagement. The direct pathway reflects the possibility that students with stronger readiness may participate more effectively because digital tasks impose lower cognitive and technical barriers. Simultaneously, the indirect pathway proposes that readiness strengthens learners' sense of competence and autonomy, which subsequently enhances learning motivation and deeper engagement.

The distinction between full and partial mediation is theoretically significant. A full mediation model would imply that readiness influences engagement only through motivation. However, existing evidence suggests that readiness itself may independently facilitate participation by reducing technological anxiety, increasing navigational fluency, and improving learning management capability (Broadbent & Poon, 2015; Rasheed et al., 2020). Therefore, motivation is conceptualised not as the sole explanatory pathway, but as an important psychological mechanism that strengthens and channels the effect of readiness toward sustained engagement.

By incorporating engagement theory more centrally and clarifying the mediating role of learning motivation, the framework advances beyond readiness classification toward a more comprehensive explanation of digital learning participation. The proposed structure therefore contributes to a growing body of literature seeking integrated explanations of how learner capability, motivational processes, and enacted engagement interact within higher education digital environments.

Table 1: Mapping Prior Research and Identified Conceptual Gaps in Digital Learning Readiness, Motivation, and Academic Engagement

Study	Main Focus	Theory Used	Method	Gap Left
Hung et al. (2010)	Development of online learning readiness scale	Scale development grounded in online learning readiness construct	Survey + validation	Does not theorise the relationship between readiness and engagement within a unified framework
Broadbent & Poon (2015)	Self-regulated learning in online environments	Self-regulated learning theory	Systematic review	Focus on performance, not engagement
Fredricks et al. (2004)	Conceptualization of engagement	Engagement theory	Conceptual review	No digital readiness integration
Kahu (2013)	Framework of student engagement	Socio-ecological model	Conceptual	Does not operationalise readiness as learner resource
Sun & Rueda (2012)	Motivation & engagement in online learning	Motivational perspective	Survey	Does not conceptualise digital readiness as an antecedent resource

Halverson & Graham (2019)	Engagement in blended learning	Engagement framework	Conceptual synthesis	Does not theorise readiness–motivation mechanism
Rasheed et al. (2020)	Challenges in blended learning	Systematic review	Systematic review	Focus on challenges, not engagement pathway

Conceptual Framework

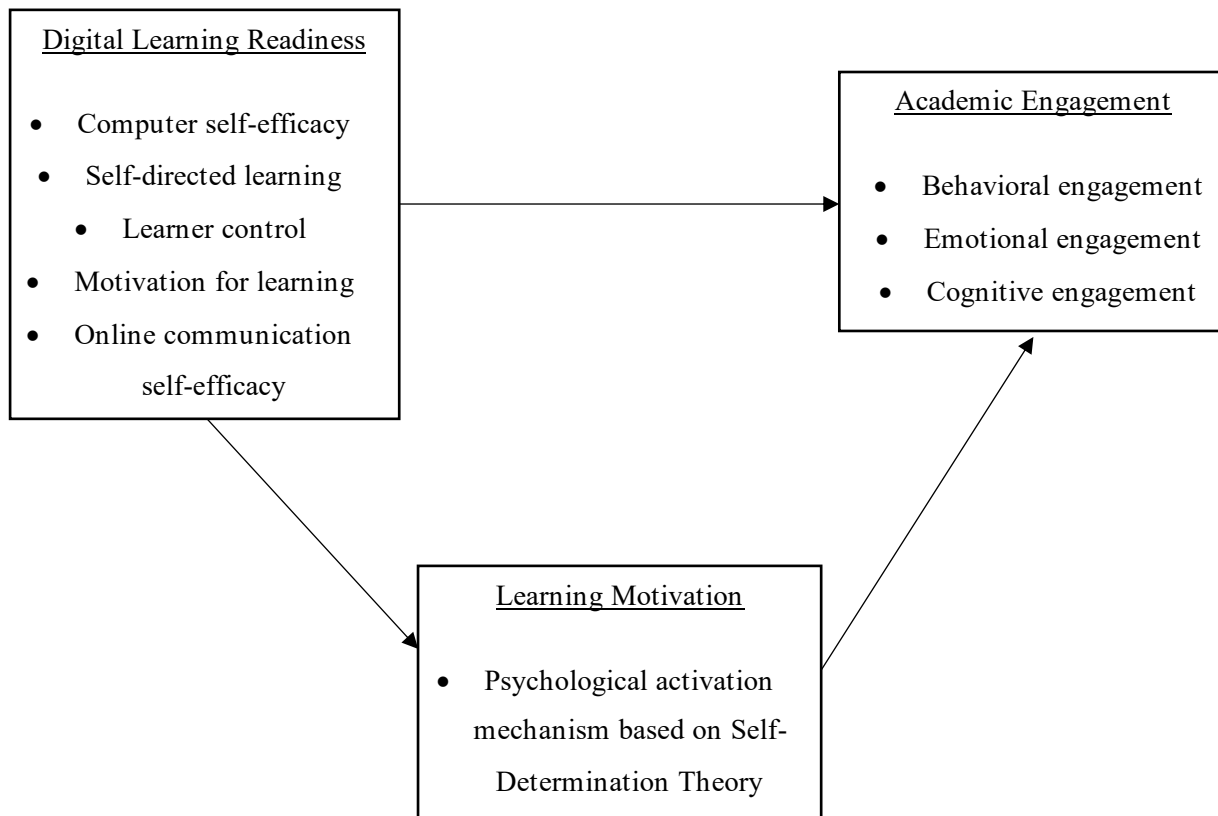


Figure 1: The Proposed Conceptual Framework Linking Digital Learning Readiness, Learning Motivation, and Academic Engagement

As illustrated in Figure 1, to address the identified conceptual gap, this study proposes a structured framework linking digital learning readiness, learning motivation, and academic engagement. Digital learning readiness is established as the fundamental antecedent. As conceptualized by Hung et al. (2010), readiness encompasses self-directed learning, learner control, computer self-efficacy, and online communication competence. These components represent the intrinsic capabilities that enable students to function effectively in technology-mediated environments. However, the possession of skill does not guarantee active participation. Readiness reflects potential for engagement rather than guaranteed involvement.

Academic engagement represents observable behavioural, emotional, and cognitive investment in learning activities, reflected through sustained participation and deep cognitive involvement. Engagement represents enacted learning investment rather than latent capability.

The framework positions learning motivation as the activating mechanism linking readiness and engagement. Drawing from Self-Determination Theory, motivation shapes the extent to which learners mobilise their capabilities to achieve learning goals (Deci & Ryan, 2000). When students experience competence and autonomy, they are more likely to internalise academic goals and sustain their efforts. In digitally mediated learning environments where autonomy is heightened, motivational activation becomes particularly influential.

Consequently, the model specifies two distinct pathways. First, digital learning readiness is expected to exert a *direct influence* on academic engagement. Students with higher readiness may perceive digital tasks as less cognitively demanding, thereby engaging more readily. Second, readiness is proposed to influence engagement *indirectly* through learning motivation. In this pathway, readiness enhances a student's perception of competence and control, which in turn strengthens their motivation. Motivation then converts this internal confidence into sustained behavioural and cognitive involvement.

The inclusion of both direct and indirect paths reflects a partial mediation logic. While readiness lowers the barrier to participation, motivation determines whether that lowered barrier results in meaningful academic commitment. By incorporating this mediating mechanism, the framework avoids the deterministic assumption that capability automatically leads to engagement. Instead, it demonstrates that engagement is the outcome of capability activated by motivation.

This rationale shifts the discussion from describing readiness and engagement separately toward explaining their linkage through motivational processes. It offers a structured conceptual basis for understanding how digital capability transforms into active academic participation within higher education contexts.

Theoretical Contributions

This paper provides several theoretical contributions to the literature on digital learning in higher education. First, it advances the conceptualisation of digital learning readiness beyond discussions centred on measurement. A substantial portion of existing research has focused on validating readiness scales or identifying their constituent dimensions (Hung et al., 2010). Although these efforts are important, readiness is often treated as an outcome rather than as a theoretically positioned construct. This paper reconceptualises digital learning readiness as a foundational learner-level resource that precedes academic engagement. In doing so, it shifts theoretical emphasis from measurement validation toward explanatory integration.

Second, this study contributes by linking two research streams that have largely developed independently. Research on academic engagement has primarily examined environmental conditions, pedagogical design, and institutional influences (Fredricks et al., 2004; Kahu, 2013), whereas readiness research has concentrated on learner capabilities within digital contexts. The proposed framework connects these strands by theorising how internal learner capabilities translate into observable engagement behaviour. This integration offers a more coherent understanding of engagement in digitally mediated higher education.

Third, the paper introduces a motivational activation mechanism into the readiness–engagement relationship. Drawing on Self-Determination Theory (Deci & Ryan, 2000), the

framework conceptualises learning motivation as the psychological process that converts readiness into active engagement. Rather than assuming a direct and deterministic link between competence and participation, the model proposes that readiness influences engagement both directly and indirectly through motivational processes. This mediational logic extends existing engagement theory by embedding it within a capability–motivation sequence.

Fourth, the study clarifies the conceptual distinction between competence and engagement. Readiness reflects perceived competence and self-regulatory capacity, whereas engagement represents enacted behavioural and cognitive investment. By clearly differentiating these constructs, the framework reduces conceptual overlap that frequently appears in digital learning research. This clarification enhances theoretical precision and strengthens the foundation for future empirical investigation.

Finally, by situating readiness, motivation, and engagement within a single structured model, this paper offers a theoretically coherent basis for subsequent empirical research. The framework provides clearly articulated relational propositions that can be tested across diverse higher education contexts, particularly in technology-intensive learning environments. In doing so, it contributes toward a more integrated theoretical account of digital learning participation.

This contribution is important because research on educational technology continues to show that engagement in digital higher education is multidimensional and cannot be explained through technology use alone (Bond et al., 2020; Halverson & Graham, 2019).

Practical Implications

This framework carries significant practical implications for colleges and universities undergoing digital transformation. First, reconceptualising digital learning readiness as a foundational learner resource suggests that institutions should move beyond programmes that focus solely on technical skills. Universities often equate readiness with access to devices or basic platform training. However, the framework indicates that readiness also involves self-directed learning capability, learner control, and confidence in online communication. Institutional initiatives should therefore provide structured support that strengthens self-regulation skills and digital self-efficacy, rather than concentrating exclusively on technical onboarding.

Second, the mediating role of learning motivation underscores the importance of psychological conditions in digital learning environments. Even when students possess the technical capability to operate online platforms, engagement may remain limited if motivation is weak. Universities should therefore design learning environments that foster autonomy, competence, and relatedness, consistent with the principles of Self-Determination Theory. Instructional strategies that offer meaningful choice, constructive feedback, and opportunities for mastery may reinforce the motivational pathway outlined in the framework.

Third, the partial mediation logic indicates that enhancing readiness alone may not be sufficient to sustain engagement over time. Institutional policies should adopt a dual-focus strategy that simultaneously strengthens digital capability and supports motivational quality. This may include integrating reflective learning activities, structured peer interaction, and formative assessment practices that encourage sustained participation.

Finally, the framework provides guidance for institutional diagnostics. Rather than assessing engagement in isolation, universities can examine readiness and motivation as antecedent conditions that shape participation. This layered diagnostic approach may enable more targeted interventions, particularly in contexts where digital adoption has accelerated rapidly.

Taken together, the proposed framework offers a structured lens through which higher education institutions can align digital capability development with motivational support strategies to enhance student engagement.

Limitations and Future Research Directions

The framework presented here remains conceptual and has not yet been subjected to empirical testing. Although the proposed relationships draw from established theoretical traditions, the mediating structure requires verification through systematic investigation. Empirical studies would be necessary to determine whether the relationships operate with similar strength across institutional settings and whether the motivational pathway functions consistently in diverse higher education environments.

This model intentionally centres on learner-level resources. As a result, broader contextual influences such as instructional design, institutional support, and learning culture are not explicitly incorporated. Prior research on engagement has shown that these environmental conditions shape patterns of participation. Examining how such contextual factors interact with readiness and motivational processes would extend the explanatory reach of the framework.

Digital learning readiness is conceptualised here as a multidimensional construct grounded in prior scale development studies. Yet readiness may evolve rather than remain static. As students gain experience within digital environments, their confidence, autonomy, and regulatory capacity may shift. Longitudinal inquiry would provide insight into how these changes unfold over time and how they relate to evolving engagement trajectories.

The framework also does not differentiate among academic disciplines or instructional modalities. Engagement patterns in fully online courses may not mirror those in blended or face-to-face settings. Exploring whether the proposed relationships hold across delivery formats and disciplinary contexts would strengthen the robustness of the model.

Future work could also incorporate cross cultural comparisons. This would be useful because live online learning readiness studies have shown that motivation, readiness, and self efficacy may vary across learner groups and programme levels during periods of rapid digital learning adoption (Tang et al., 2021).

The present framework should therefore be understood as a theoretically informed foundation rather than a definitive account. Its explanatory value depends on empirical refinement and contextual examination across varied higher education settings.

Conclusion

Digital transformation in higher education has changed the conditions under which students participate in learning. Understanding such participation requires more than examining technology access or platform familiarity. Research has often treated digital readiness and

academic engagement as separate concerns. What remains less developed is a clear explanation of how these constructs connect.

The framework proposed here addresses that gap by positioning digital learning readiness as a foundational learner resource and identifying learning motivation as the mechanism through which readiness becomes enacted engagement. Capability alone does not guarantee involvement. Students may possess the necessary skills yet remain disengaged. The model therefore emphasises that motivational processes shape whether readiness translates into sustained participation.

By bringing readiness and motivation into a single explanatory structure, the framework clarifies how internal learner conditions influence engagement in digitally mediated contexts. Engagement is not presented as an automatic outcome of competence, but as the result of interacting psychological factors.

This study is conceptual in scope. Its contribution lies in organising previously parallel discussions into a coherent theoretical account. Empirical work will ultimately determine the stability of the proposed relationships. Nevertheless, the framework offers a structured basis for advancing inquiry into digital learning participation in higher education.

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